



Name:

Video Solutions:



MATHS FOR GRANTED EASTER GCSE MOCK EXAMINATIONS 2023

PAPER 2 (Calculator) Higher Tier Time: 1 hour 30 minutes

You must have: Ruler, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

Instructions

Use **black** ink or ball-point pen.

Fill in your name at the top of this page.

Answer **all** questions.

Answer the questions in the spaces provided.

Calculators MAY be used.

Diagrams are **NOT** accurately drawn, unless otherwise indicated.

You must **show all your working out.**

Information

The total mark for this paper is 80.

The marks for **each** question are shown in brackets.

Advice

Read each question carefully and try to answer every question.

Keep an eye on the time and check your answers, if you have time, at the end.

Q1.

Ping chooses four numbers.

The mode of these four numbers is 8, the range is 7 and the mean is 11.

Find Ping's four numbers.

.....
(Total for question = 3 marks)

Q2.

The length of each side of a regular pentagon is 8.4 cm to 1 decimal place.

(a) Complete the error interval for the length of one side.

.....cm \leq length $<$ cm

(2)

(b) Complete the error interval for the perimeter.

.....cm \leq perimeter $<$ cm

(1)

(Total for question = 3 marks)

Q3. The cost of a ticket increases by 10% to £19.25.

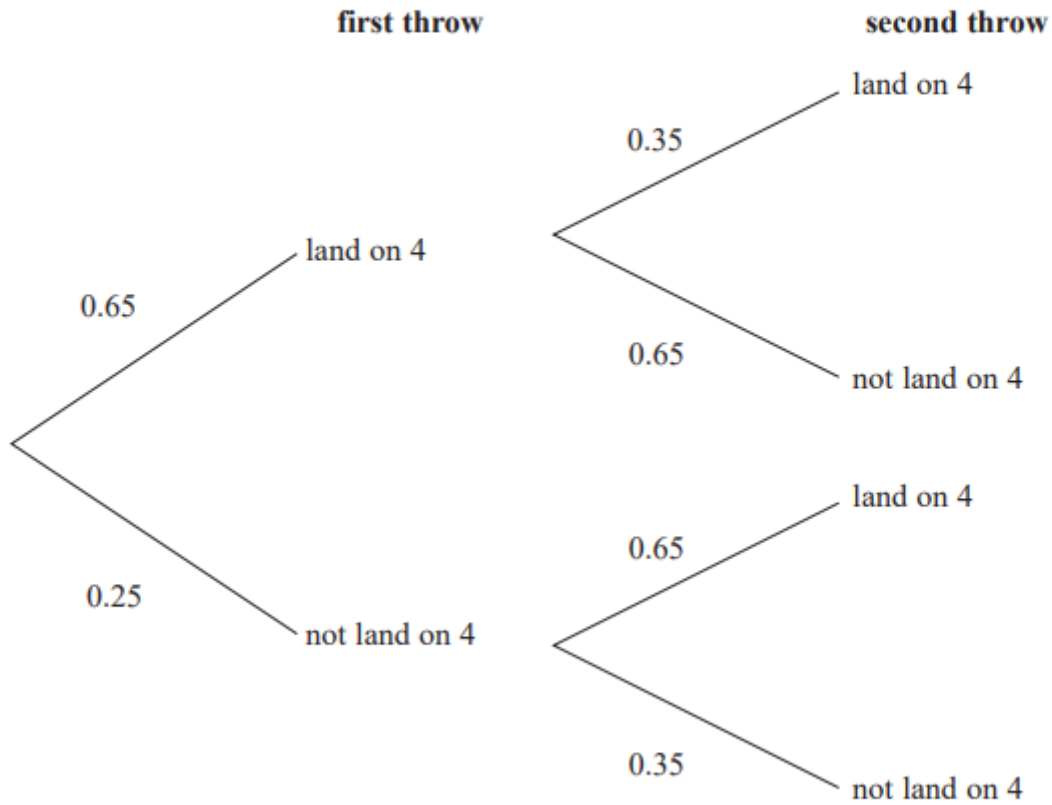
Work out the original cost.

£.....
(Total for question = 3 marks)

Q4.

When a biased 6-sided dice is thrown once, the probability that it will land on 4 is 0.65
The biased dice is thrown twice.

Amir draws this probability tree diagram.
The diagram is **not** correct.



Write down **two** things that are wrong with the probability tree diagram.

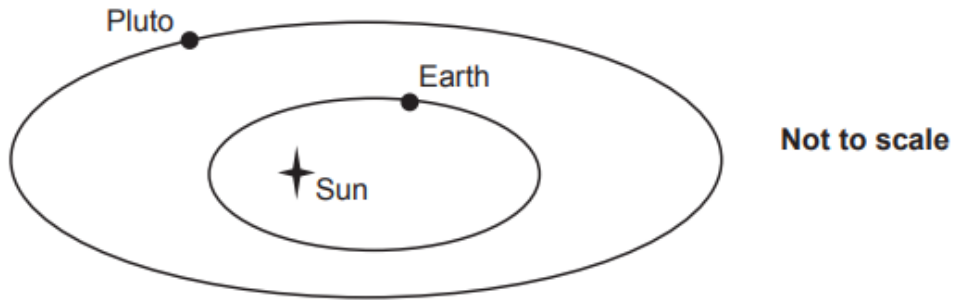
1).....

2).....

(Total for question = 2 marks)

Q5.

Earth and Pluto go around the Sun.
Their distance to the Sun varies.



The table shows the closest distance that Earth and Pluto get to the Sun.

	Closest distance to the Sun (km)
Earth	1.47×10^8
Pluto	4.44×10^9

- (a) Show that the closest distance of Pluto to the sun is roughly 30 times the closest distance of Earth to the Sun.

(2)

- (b) Give a reason why we **cannot** use this information to say

**The distance of Pluto to the Sun is always
30 times the distance of Earth to the sun.**

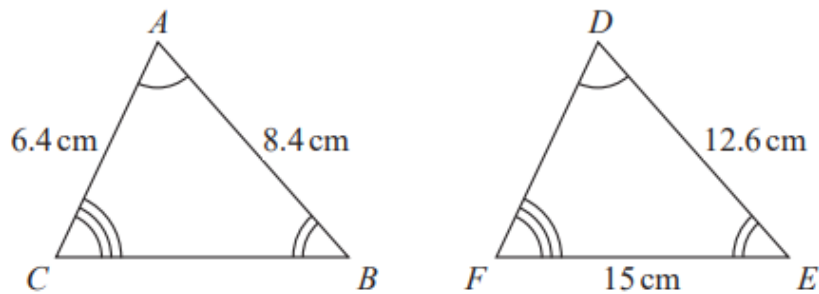
(1)
(Total for question = 3 marks)

Q6. Solve $8 > 3 - \frac{1}{2}x$

.....
(Total for question = 2 marks)

Q7.

Triangle *ABC* and triangle *DEF* are similar.



(a) Work out the length DF.

.....cm
 (2)

(b) Work out the length of CB.

.....cm
 (2)
(Total for question = 4 marks)

Q8.

A bee flies from its hive to a flower at a constant speed of 7.5 metres per second for 10 seconds.

The bee then takes 15 seconds to fly back to the hive.

Assume the bee always flies in a straight line.

- (a) Ignoring the time spent at the flower, work out the **overall** average speed of the bee in its flight from the hive to the flower and back.

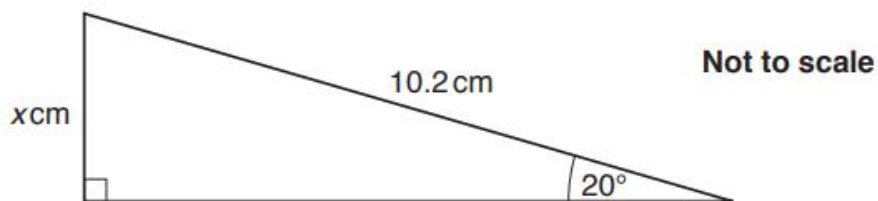
.....metres per second.
(4)

- (b) If the bee is not assumed to fly in a straight line , how might your answer be affected?

(1)
(Total for question = 5 marks)

Q9.

Here is a right-angled triangle.

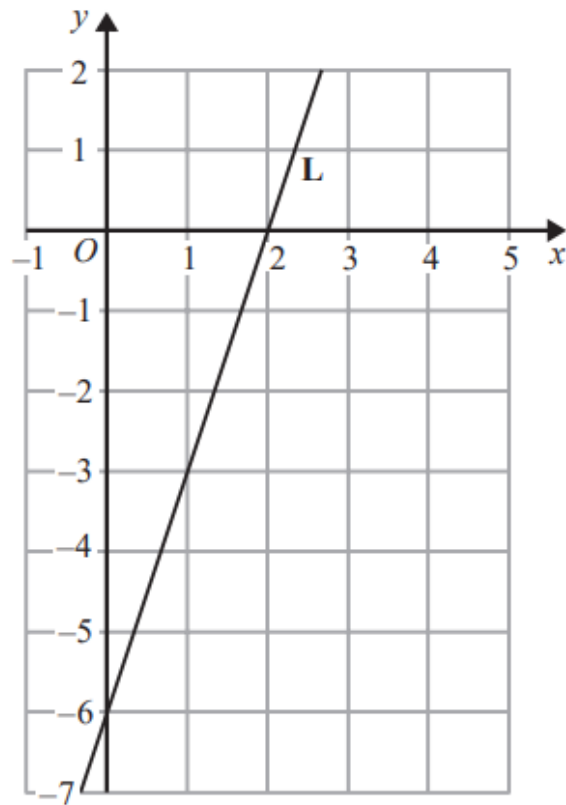


Use trigonometry to work out the value of x .

$x = \dots\dots\dots$ cm
(Total for question = 3 marks)

Q10.

The line **L** is shown on the grid.



Find an equation for **L**.

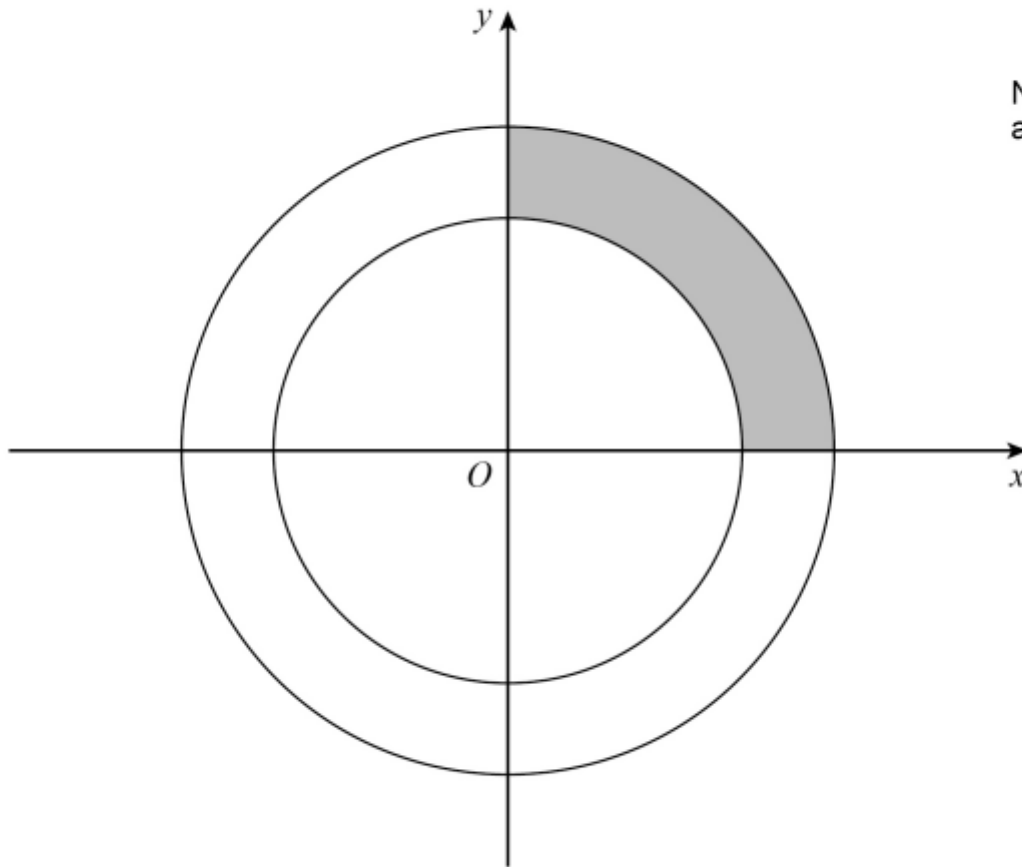
.....

(Total for question = 3 marks)

Q11.

The equations of the two circles shown are

$$x^2 + y^2 = 100 \quad \text{and} \quad x^2 + y^2 = 36$$



Not drawn accurately

Work out the shaded area.

Give your answer as an integer multiple of π .

.....units²

(Total for question = 3 marks)

Q12.

Ying has 4 black counters and 3 white counters.

There is a number on each counter.

The mean of the numbers on the black counters is 11.5

The mean of the numbers on the white counters is 9

Calculate the mean, to 3 significant figures, of the numbers on all 7 counters.

.....

(Total for question = 3 marks)

Q13.

A regular polygon has n sides.

Each interior angle of the regular polygon is 135° **greater** than each exterior angle of the polygon.

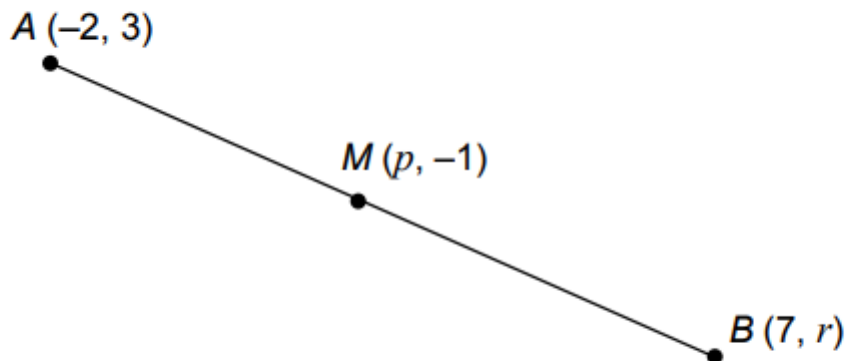
Find the value of n .

$n = \dots\dots\dots$

(Total for question = 3 marks)

Q14.

M is the midpoint of the line AB .



Not drawn accurately

Work out the values of p and r .

$p = \dots\dots\dots r = \dots\dots\dots$

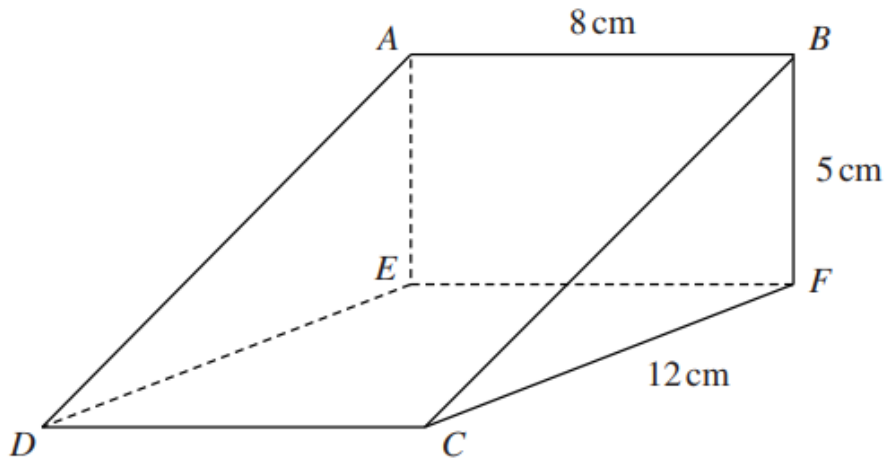
(Total for question = 2 marks)

Q15. A wildlife biologist is studying the population of squirrels in a park. They capture 60 squirrels and mark them with a tag, then release them back into the park. A week later, they capture another 80 squirrels, of which 12 are tagged. What is the estimated size of the squirrel population in the park, assuming no squirrels have died or migrated in the last week?

.....
(Total for question = 3 marks)

Q16.

A prism $ABCDEF$ with a right-angled triangular cross section has dimensions as shown.



Not drawn accurately

(a) Calculate the length BD .

.....cm
(3)

(b) Hence, or otherwise, calculate the angle BDF .

.....degrees
(2)
(Total for question = 5 marks)

Q17.

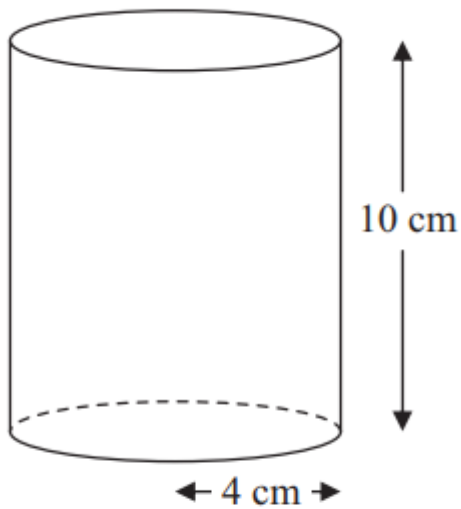


Diagram **NOT**
accurately drawn

A solid cylinder has a radius of 4 cm and a height of 10 cm.

- (a) Work out the volume of the cylinder.
Give your answer correct to 3 significant figures.

.....cm³
(2)

The cylinder is made from wood.
The density of the wood is 0.6 grams per cm³.

- (b) Work out the mass of the cylinder.
Give your answer correct to 3 significant figures.

.....grams
(2)

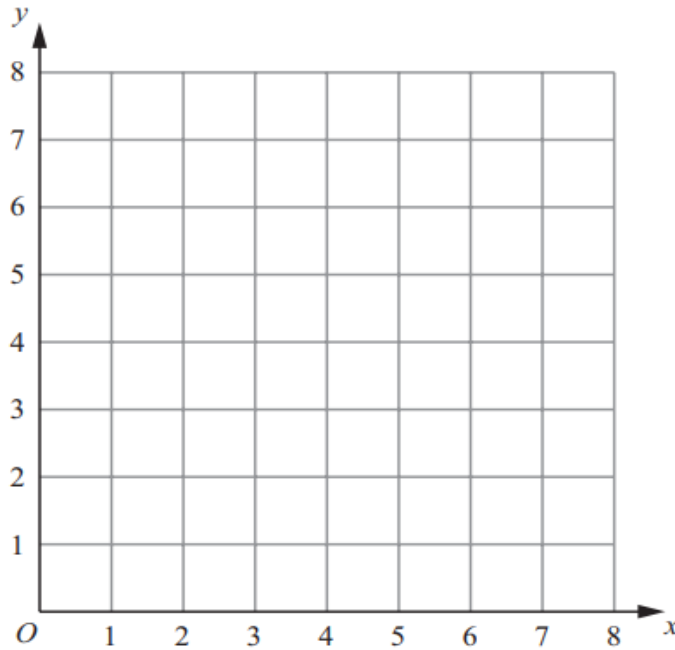
(Total for question = 4 marks)

Q18.

The region **R** satisfies the inequalities

$$x \geq 2, \quad y \geq 1, \quad x + y \leq 6$$

On the grid below, draw straight lines and use shading to show the region **R**.



(Total for question = 3 marks)

Q19.

Katy drove for 238 miles, correct to the nearest mile.
She used 27.3 litres of petrol, to the nearest tenth of a litre.

$\text{Petrol consumption} = \frac{\text{Number of miles travelled}}{\text{Number of litres of petrol used}}$

Work out the upper bound for the petrol consumption for Katy's journey.
Give your answer correct to 2 decimal places.

.....miles per litre

(Total for question = 3 marks)

Q20. There are 20 counters in a bag.

There are 7 red counters.

The rest of the counters are green or white.

Bernard takes at random 2 counters from the bag.

The probability that Bernard will take 2 white counters is $\frac{1}{19}$

Calculate the probability that Bernard will take 1 green counter and 1 white counter.

.....
(Total for question = 5 marks)

Q21.

Solve $x^2 - 2x - 3 \geq 0$

.....
(Total for question = 4 marks)

Q22.

A sequence of fractions is

$$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \dots$$

(a) The n th fraction of this sequence is $\frac{n}{n+1}$

Write down an expression for the $(n+1)$ th fraction in the sequence.

.....
(1)

(b) Subtracting the first fraction from the second gives $\frac{2}{3} - \frac{1}{2} = \frac{1}{6}$

Subtracting the second fraction from the third gives $\frac{3}{4} - \frac{2}{3} = \frac{1}{12}$

Prove algebraically that the difference between any two consecutive fractions in this sequence is the reciprocal of the product of the denominators.

(3)

(Total for question = 4 marks)

Q23. Solve the simultaneous equations

$$x^2 + y^2 = 85$$

$$x + y = 13$$

$$x = \dots\dots\dots, y = \dots\dots\dots$$

$$x = \dots\dots\dots, y = \dots\dots\dots$$

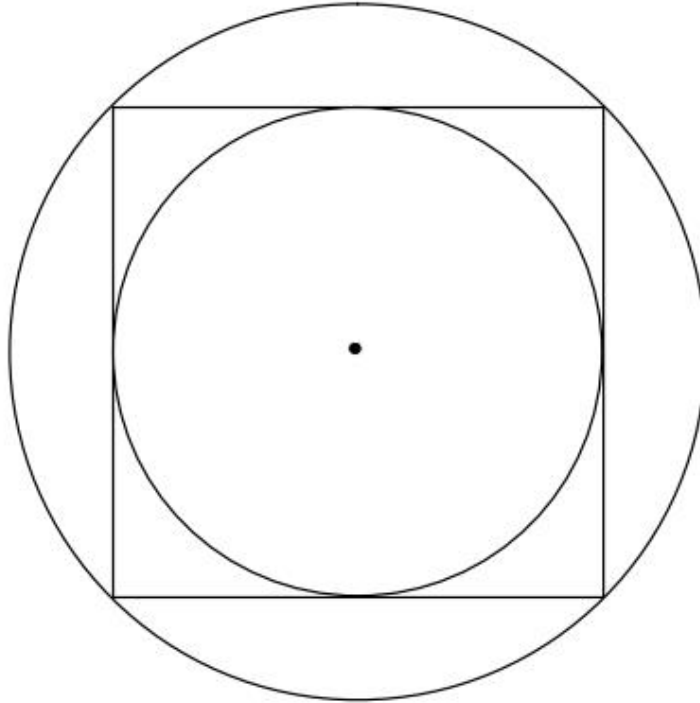
(Total for question = 4 marks)

Q24.

The diagram shows a square and two circles.

The smaller circle has radius r and touches the sides of the square.

The larger circle has radius R and passes through the vertices of the square.



Show that $R = r\sqrt{2}$

(Total for question = 3 marks)

TOTAL FOR PAPER IS 80 MARKS